resistance in sand were developed by Reese et al. (1974), while the weathered rock model utilized the limestone model was developed by McVay (2004).

Lateral group analysis considered the spacing between the shafts, which for this bridge was 24 feet, or six times the four foot diameter of each shaft (6D). Thus, the P-y multipliers were set to 1. For the 6D spacing, axial group capacity was considered to be unaffected.

Equivalent Model

After a single shaft lateral analysis was performed in MultiPier using the same soil profile used for the full bent analysis, the equivalent model parameters were calculated based on the proposed procedure by Robinson et al. (2006). The equivalent model parameters, including effective length, are shown in Table 2. These effective lengths were then input into a SAP frame without soil and are presented in the next section as "SAP—Equivalent."

Table 2. Equivalent Model Parameters for Rowan County Bridge

EQUIVALENT MODEL PARAMETERS				
Head	Le (ft)	α	B	K
Fixed	36.3	0.92	0.28	1.1
Free	22.9	0.23	0.28	2.1

Analysis Results—SAP and MultiPier

Models of the bridge pier were created in both MultiPier and SAP. Figure 10 shows the MultiPier model. The input files can be found in the Electronic Appendix and results are summarized in Table 3, Table 4 and Table 5 for axial, and lateral responses, and capacity demand, respectively. These tables compare specific critical load cases by considering the predicted maximum moment, shear and axial loads in a particular drilled shaft foundation. The ratio of the demand placed on the shaft due to the AASHTO load cases to the capacity of the shaft based on the combined axial force and moment capacity is also shown.